

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 26 Feb 2002	3. REPORT TYPE AND DATES COVERED Final Report 30 Aug 00 - 30 Sept 02	
4. TITLE AND SUBTITLE A Research and Analysis of Technology Trends, Engineering Management, and Statistical Methods			5. FUNDING NUMBERS DAAH01-98-D-R001 D.O. 091	
6. AUTHORS Dawn R. Utley				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Industrial & Systems Engineering and Engineering Management Dept, UAH			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Aviation & Missile Command Redstone Arsenal, AL 35898			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT A			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>A requirement for the implementation of IPD is an understanding of technology trends, engineering management and statistical methodologies, which are major components in developing a successful strategy for weapon systems. The Engineering Directorate requires support and expertise in these critical areas to meet its requirement to the AMCOM community. A training/education program was developed and a plan to offer such was made to ED engineering personnel. A strategy was developed by which the engineering capabilities particularly in the areas of systems engineering and quality engineering could be refreshed through a series of seminars and training programs. A list of strategic initiatives was developed to aid in the integration of the missile and aviation groups.</p>				
14. SUBJECT TERMS 20020314 118			15. NUMBER OF PAGES 4	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT	

DAAHOI-98-D-R 001

D.O. 091

PLEASE CHECK THE APPROPRIATE BLOCK BELOW

DAO#

☐7

copies are being forwarded. Indicate whether Statement A, B, C, D, E, F, or X applies.

☒

DISTRIBUTION STATEMENT A:

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

☐

DISTRIBUTION STATEMENT B:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES ONLY; (indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐

DISTRIBUTION STATEMENT C:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTS (Indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐

DISTRIBUTION STATEMENT D:

DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐

DISTRIBUTION STATEMENT E:

DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐

DISTRIBUTION STATEMENT F:

FURTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office and Date) or HIGHER DoD AUTHORITY.

☐

DISTRIBUTION STATEMENT X:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED TECHNICAL DATA IN ACCORDANCE WITH DoD DIRECTIVE 5230.25. WITHHOLDING OF UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of determination). CONTROLLING DoD OFFICE IS (Indicate Controlling DoD Office).

☐

This document was previously forwarded to DTIC on _____ (date) and the AD number is _____.

☐

In accordance with provisions of DoD instructions. The document requested is not supplied because:

☐

It will be published at a later date. (Enter approximate date, if known).

☐

Other. (Give Reason)

DoD Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution statements, as described briefly above. Technical Documents must be assigned distribution statements.

Dawn R. Utley
Print or Type Name

Dawn R. Utley
Authorized Signature/Date

256-824-6075
Telephone Number

Technical Report 5-21029
Contract No. DAAH01-98-D-R001
Delivery Order No. 091

**A Research and Analysis of Technology Trends, Engineering Management, and
Statistical Methods
(5-21029)**

Final Technical Report for Period
30 August 2000 through 30 September 2001

February 2002

Prepared by:

Dawn R. Utley

N136 Technology Hall
Industrial and Systems Engineering and Engineering Management Department
The University of Alabama in Huntsville
Huntsville, Alabama 35899

Prepared for:

U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898
Attn.: Ms. Patti Martin

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

PREFACE

This technical report was prepared by the faculty of the Industrial and Systems Engineering and Engineering Management Department at the University of Alabama in Huntsville. The purpose of this report is to provide documentation of the work performed and results obtained under Delivery Order 091 of AMCOM Contract No. DAAH01-98-D-R001. Dr. Dawn R. Utley was the principal investigator. Drs. Phillip A. Farrington and Paul J. Compton served as co-principal investigators for the project. Ms. Patti Martin, Engineering Directorate, Missile Research, Development and Engineering Center, provided technical guidance.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.

Except as provided by the Contract Data Requirements List DD Form 1423, hereof, the distribution of any contract report in any state of development or completion is prohibited without the approval of the Contracting Officer.

Prepared for: Commander
U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898

I have reviewed this report, dated February 2002, and the report contains no classified information.

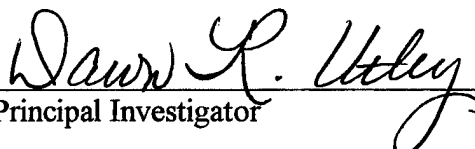

Principal Investigator

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	OBJECTIVES	1
3.0	STATEMENT OF WORK	1
4.0	CONCLUSIONS AND RECOMMENDATIONS	2

1.0 Introduction

The Aviation and Missile Command Research Development and Engineering Center (AMRDEC) has been identified as the U.S. Army Aviation and Missile Command (AMCOM) proponent for Integrated Product Development (IPD). As the Command's focal point, the ED is committed to providing the AMCOM community with a solid analytical foundation for the implementation and management of IDP teams.

A requirement for the implementation of IPD is an understanding of technology trends, engineering management and statistical methodologies, which are major components in developing a successful manufacturing and support strategy for weapon system life cycle cost reduction. The ED requires support and expertise in these critical areas to meet its requirement to the AMCOM community.

2.0 Objective

The objective of this task is to provide analytical support to the ED in the development of strategic plans to support aviation and missile manufacturing. This task shall include as analysis of the current AMCOM and ED infrastructures to support the weapon system manufacturing process. An outcome of the task shall be recommendations regarding the AMRDEC and ED strategies for implementing technology trends, engineering management, and statistical expertise.

3.0 Statement of Work

The statement of work, as outlined in delivery order 091, was as follows:

- 3.1 UAH shall investigate current methodologies used within the AMRDEC and ED to organize and maintain its engineering capability to provide expertise to the AMCOM project offices. This investigation shall determine past procedures used by the AMRDEC and ED to implement management philosophies, such as IPD, and manufacturing technologies, such as statistical process control (SPC).
- 3.2 UAH shall perform data gathering activities including interviews of key AMRDEC and ED personnel to determine the effectiveness of current engineering management approaches in the development of aviation and missile manufacturing plans and strategies.
- 3.3 Based on the findings of the above action items, UAH shall develop and document an improvement strategy for the implementation of engineering management approaches and statistical methodologies with the AMRDEC and ED. This strategy shall include an evaluation of current deficiencies within the AMRDEC and ED engineering functions, and recommendations on how these deficiencies can be addressed.

4.0 Conclusion and Recommendations

During the time frame allocated by the delivery order, members of the UAH Industrial and Systems Engineering Department, with the cooperation of representatives from AMCOM Engineering Directorate, conducted research and analysis into the current methods and strategies for maintaining its engineering capabilities. As a result, a training/education program was developed and offered to ED engineering personnel. Graduate courses were identified that met specific needs of ED and commitments were made to teach a series on site at the Arsenal.

A strategy was developed by which the engineering capabilities particularly in the areas of systems engineering and quality engineering could be refreshed through a series of seminars and training programs. Ideas were shared and a plan developed for further detailed development of specific needs within ED. Such future activities were to include survey instruments on the current systems engineering tools in use and what was needed for future work, quality engineering assessment surveys, and engineering management training.

Discussions were held with key personnel about the merging of the aviations group and the missile group and the resultant management challenges and opportunities present. A day long off-site with the executive management group was held. As part of this off site an intensive strategy session was held in which strengths and weaknesses were discussed followed by a brainstorming session to generate possible solutions and opportunities. After small group discussions and evaluations of alternatives, a list of strategic initiatives was developed to aid in the integration of the two groups and new directions set for the new merged group.

The result of each activity led to the establishment of future follow-on contract work to develop and put in place the recommendations that resulted from the research under this contract.